

Claims

1. An external storage apparatus characterized by comprising:

a main body;

5 a memory substrate, on which at least a semiconductor memory mounted, having an external connection terminal at one end thereof;

10 a substrate holder having a substrate insertion through-hole therein through which said memory substrate to be inserted, for fixing said memory substrate to said main body under in such a way that said external connection terminal projects outward from an opening at one end of said substrate insertion through-hole; and

15 a cap to be attachable and detachable to and from said substrate holder for protecting said external connection terminal;

wherein erroneous assembly restricting means is provided in said main body, for restricting assembly if assembly posture of said memory substrate is not correct.

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2. The external storage apparatus according to claim 1 is characterized in that:

25 said erroneous assembly restricting means is a rib extending to a direction intersecting with other end of said memory substrate and restricts advancement of said memory substrate into said main body by contacting with other end of said memory substrate if assembly posture of said memory substrate with respect to said main body is not correct.

30 3. The external storage apparatus according to claim 2 is characterized in that:

a holding groove is formed on said rib, for holding other end of said memory substrate if assembly posture of said memory substrate with respect to said main body is correct.

5 4. The external storage apparatus according to claim 3
is characterized in that:

said holding groove holds said memory substrate in accompaniment with plastic deformation as said memory substrate advances.

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5. The external storage apparatus according to claim 2
is characterized in that:

a guide groove is formed on said rib, for guiding advancement of said memory substrate into said main body if
15 assembly posture of said memory substrate with respect to
said main body is correct.

6. The external storage apparatus according to claim 5
is characterized in that:

20 a holding section is provided at a bottom of said main body, for holding other end of said memory substrate advanced.

7. The external storage apparatus according to claim 6
is characterized in that:

25 said holding section holds said memory substrate in accompaniment with plastic deformation due to advancement of said memory substrate.

8. The external storage apparatus according to claim 1
30 is characterized in that:

said main body has a space thorough which said substrate

holder is inserted, and a restriction section is provided on an inner surface of said space, for restricting advancement of said substrate holder into said space by contacting with said substrate holder if assembly posture of said substrate holder with respect to said main body is not correct.

9. The external storage apparatus according to claim 8 is characterized in that:

10 a plurality of liner ribs is provided on an outer surface of an end region at inserted side of said substrate holder to said space, along an insertion direction of said substrate holder with respect to said space;

15 wherein said plurality of liner ribs is respectively provided positions where said ribs does not contact with said restriction section if assembly posture of said substrate holder with respect to said main body is correct and where said ribs contact with said restriction section if assembly posture of said substrate holder is not correct.

20 10. The external storage apparatus according to claim 9 is characterized in that:

at least some of said plurality of ribs are functioned as a welding rib between said main body and said substrate holder during ultrasonic welding.

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11. The external storage apparatus according to claim 1 is characterized in that:

30 said main body is shaped in a substantially columnar form and a space through which said substrate holder to be inserted is opened on a periphery surface thereof and an end portion at said main body side of said cap is shaped

corresponding to said periphery surface of said main body.

12. The external storage apparatus according to claim 11
is characterized in that:

5 each end of said main body that is shaped in a
substantially columnar form has an inwardly curved shape,
and a wave-shaped section for a slip prevention is provided
at a front and rear surfaces of said cap.

10 13. The external storage apparatus according to claim 1
is characterized in that:

said memory substrate is arranged at an offset position
with respect to a central axial position of said main body.

15 14. The external storage apparatus according to claim 1
is characterized in that:

said main body comprises
a first main body through which said substrate holder
to be inserted and
20 a second main body forming an end region at an opposite
side to a side through which said substrate holder to be
inserted;

wherein a slot is provided to said second main body,
for attaching and detaching a card-like semiconductor memory
25 apparatus to and from said memory substrate.

15. The external storage apparatus according to claim 14
is characterized in that:

said second main body is joined to said first main body
30 by snap connection through a plurality of engaging pawls.

16. The external storage apparatus according to claim 15
is characterized in that:

a wall section is provided to said first main body,
for restricting advancement of at least some of said engaging
5 pawls into said first main body if assembly posture is not
correct.

17. The external storage apparatus according to claim 1
is characterized in that:

10 a gap is formed between an inner wall surface of said
main body and other end of said memory substrate , and said
external connection terminal is press-fitted to an opening
at one end of said substrate insertion through-hole.

15 18. The external storage apparatus according to claim 1
is characterized in that:

a guide section is formed in said substrate insertion
through-hole, for guiding advancement of said memory
substrate into said substrate holder if assembly posture of
20 said memory substrate with respect to said substrate holder
is correct.

19. The external storage apparatus according to claim 1
is characterized in that:

25 said main body has a structure split up into two parts
of top and bottom, and said substrate holder is held by said
two-parts structured main body.

20. The external storage apparatus according to claim 19
30 is characterized in that:

a mechanism for determinating a position of said

substrate holder in a back and forth direction is provided within said main body.

21. The external storage apparatus according to claim 19
5 is characterized in that:

an engaging section for engaging with an outer peripheral surface of said substrate holder is formed in at least one of said two-parts structured main body if assembly posture of said substrate holder with respect to said main
10 body is correct.

22. The external storage apparatus according to claim 19
is characterized in that:

at least a part of outer peripheral surface of said
15 substrate holder is welded to an inner surface of said main body.

23. The external storage apparatus according to claim 19
is characterized in that:

20 a retaining section of said substrate holder is formed in an inner surface of said main body.

24. The external storage apparatus according to claim 19
is characterized in that:

25 a mechanism is provided within said main body, for supporting a peripheral edge of said memory substrate projected from said substrate holder so as to sandwich from above and below.